

Application No. 10/807,025
Docket No. 200315570-1

REMARKS

The present remarks are in response to the Office Action of January 15, 2008. Claims 1-6, 8-9, 11-19, 21-26, and 28-29 are currently pending. Claims 1, 11, and 21 have been amended to correct a typographical error.

Reconsideration of the application is respectfully requested in view of the following responsive remarks. For the Examiner's convenience and reference, the Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

In the Office Action, the following rejections were issued:

- (1) Claims 21-26 and 28-29 were rejected under 35 U.S.C. 102(c) as being anticipated by U.S. Patent Publication No. 2005/0027035 of Wang et al. (hereinafter "Wang") in view of evidence given in U.S. Patent No. 5,571,311 to Belmont et al. (hereinafter "Belmont");
- (2) Claims 1-3, 6, 8, 11-13, and 16-18 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,214,100 (hereinafter "Parazak") in view of U.S. Pat. No. 5,889,083 (hereinafter "Zhu") and U.S. Pat. No. 6,874,881 (hereinafter "Suzuki");
- (3) Claims 4-5 and 14-15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu and Suzuki, and further in view of U.S. Pat. No. 6,280,513 (hereinafter "Osumi");
- (4) Claims 9 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu and Suzuki, and further in view of U.S. Patent Publication No. 2002/0198287 (hereinafter "Ohta");
- (5) Claims 21-23, 26, and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu;
- (6) Claims 24-25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu, and further in view Osumi;
- (7) Claim 29 was rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu, and further in view of Ohta;
- (8) Claims 1-3, 6, 8, 11-13, and 16-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu, and U.S. Patent No. 6,652,055 to Oikawa et al.

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(hereinafter "Oikawa");

(9) Claims 4-5 and 14-15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu and Oikawa and further in view of Osumi; and

(10) Claims 9 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Parazak in view of Zhu and Oikawa, and further in view of Ohta.

Claim Rejections - 35 U.S.C. § 102

The Examiner has rejected claims 21-26 and 28-29 under 35 U.S.C. § 102(e) as being anticipated by Wang in view of evidence in Belmont. Before discussing the rejection, it is thought proper to briefly state what is required to sustain such a rejection. It is well settled that "[a] claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). In order to establish anticipation under 35 U.S.C. 102, all elements of the claim must be found in a single reference. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986), *cert. denied* 107 S.Ct. 1606 (1987). In particular, as pointed out by the court in *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1981), *cert denied*, 469 U.S. 851 (1984), "anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference." "The identical invention must be shown in as complete detail as is contained in the claim." *Richardson v. Suzuki Motor Co.* 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

Wang discloses the use of styrene-maleic anhydride to control black-to-color bleed in ink-jet ink. However, the Examiner is attempting to reject the aforementioned claims by Wang under a 102 standard even though Wang does not teach each and every element of the independent claim 21. Specifically, Wang does not teach an acid-functionalized pigment or being reliably jettable at all firing frequencies ranging from 3 kHz to 25 kHz.

The Applicant notes that Wang explicitly discloses "self-dispersed pigments" and not necessarily acid-functionalized pigments as presently claimed. In reference to this teaching, the Examiner has stated that "Wang et al. points to Belmont et al." in an attempt to show the acid functionalized pigment. See Office Action mailed July 25, 2007, page 3. However, the Applicant notes that Wang never incorporates Belmont by reference. As such, the Applicant

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submits that the Examiner would have to at least combine Wang with Belmont in order to establish a proper combination of elements from each reference. To be clear, the Applicant submits that the element of an acid functionalized pigment is missing from Wang and that the Examiner could only establish this element through a combination of references since Belmont is not incorporated by reference nor does Wang refer to any specific pigment from Belmont that is acid functionalized, which would serve as evidence. As such, the Applicant notes that such a combination could not establish a 102 anticipatory rejection but could only qualify as a 103 obviousness rejection. Applicants also hereby state for the Examiner's information that the Wang reference and the present invention are commonly owned and that the present invention was filed before the publication date of Wang, so Wang is not available for use in a rejection under § 103(a). MPEP 706.02(J)(1).

Even if Wang could be viewed as incorporating the material from Belmont, Wang still does not teach the element of an acid-functionalized pigment. Wang merely suggests the use of "self-dispersed pigments" and not necessarily acid-functionalized pigments as presently claimed. As such, incorporating the material from Belmont would not teach "the identical invention ... in as complete detail" as presently claimed, as required by *Richardson v. Suzuki Motor Co.* Specifically, Belmont teaches self-dispersed pigments through the attachment of ionic groups on the pigment surface. However, such an ionic group "may be an anionic group or a cationic group and the ionizable group may form an anion or a cation." See col. 5, lines 8-10. As such, Wang does not specifically teach an acid-functionalized pigment in its inks even if one were to consider the teachings of Belmont. Therefore, Wang does not teach the identical invention in as complete detail as required to establish a proper 102 rejection.

Furthermore, there is no disclosure in Wang directed to jettability of inks as related to print head firing frequency. The ink to which independent claim 21 and its dependent claims are directed is reliably jettable at all firing frequencies from 3 kHz to 25 kHz. This characteristic is a limitation of the claims in addition to the listed ink component elements. Therefore to anticipate these claims, a prior art reference must teach the firing frequency limitation as well.

The Examiner has apparently treated this characteristic as merely an intended result, rather than as an actual limitation. Those having skill in the art can appreciate that reliable jetting across such a wide range of frequencies is not a common characteristic in ink-jet inks.

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Consequently, one skilled in the art will also recognize that not every formulation based on a combination of components will exhibit the same frequency response. Given a particular combination, one skilled in the art may create a number of formulations having a given frequency response profile, where the response profile is achievable by adjusting relative proportions of the components based upon their individual properties. Similarly, the same approach can be used to arrive at a number of formulations having very different characteristics from the first set. Therefore, for a claim reciting a list of components, ranges of amounts, and frequency response characteristic(s), some combinations of amounts of components will yield inks upon which the frequency response recitation will read, while other combinations will not. In light of this common knowledge, the Applicant has recited the claim element of reliably jettable at all firing frequencies ranging from 3 kHz to 25 kHz. In other words, the Applicant submits that an ink, falling within the generally component parameters as set forth in the present independent claims but that could not be reliably jetted at all firing frequencies ranging from 3 kHz to 25 kHz, would not be covered by the claim. As such, the frequency response characteristic is a limitation on the scope of the claim that alerts one skilled in the art as to which of the many possible formulations are encompassed by the claim.

It follows that a disclosure that teaches the components without also explicitly teaching the frequency response characteristic cannot be said to be definitively disclosing that characteristic. At most, there is a mere possibility that the frequency characteristic is present in the disclosed formulations. However, the Federal Circuit has clearly stated that inherency cannot be established by possibilities or probabilities. See, e.g., In re Robertson, 169 F.3d 743, 745 (Fed Cir. 1999). Here, the Wang reference does not teach that the inks disclosed therein are reliably jettable at firing frequencies from 3 kHz to 25 kHz as required by the present claims.

The Applicants therefore submit that Wang does not anticipate claim 21 because it fails to disclose every element of the claim. Consequently, Wang also does not anticipate the claims depending from claim 21, in that they each include all of the limitations of claim 21. Applicants respectfully request that this rejection be withdrawn.

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Docket No. 200315570-1**Claim Rejections - 35 U.S.C. § 103**

The Examiner has rejected all of the pending claims under 35 U.S.C. § 103(a) based on various combinations of Parazak, Zhu, Suzuki, Oikawa, Osumi, and Ohta. Applicants submit that these rejections do not establish a case of *prima facie* obviousness because none of these references teach each and every claim limitation of the instant application. Particularly, none of the above-mentioned references teach or suggest the modification of the inks described therein to achieve a frequency printing rate that can span into the range of 15 kHz to 25 kHz (as well as be similarly printable along the entire range of 3 kHz to 25 kHz), as required by independent claims 1, 11, and 21. Because none of these references teach or suggest each and every claim limitation, Applicant respectfully requests that the obviousness rejections based on these references be withdrawn. Each rejection uses at least Parazak and Zhu. As such, these references are briefly outlined below. Additionally, Suzuki is briefly discussed.

Parazak

Parazak discloses an ink-jet ink directed to ester modified macromolecular chromophores. See col. 2, lines 22-32. As noted by the Examiner, Parazak can use a combination of solvents including ethoxylated glycerol, 2-pyrrolidinone, and 1, 5-pentanediol. See col. 5, lines 36-38.

Zhu

Zhu discloses an ink-jet ink suitable for printing on non-traditional substrates such as "glass, plastic, and metal" that are "scratch and rub resistant." See col. 1, lines 4-9. Zhu further states that "there exists a need for aqueous jet ink compositions that can meet the low VOC regulations." Zhu accomplishes this objective by using an ink composition comprising water, a colorant, a binder resin, and a wax. See col. 2, lines 39-40. Zhu states that the binder resin is a "film former," see col. 4, lines 48-51; having a preferable concentration of 5% to 10% by weight. See col. 6, lines 31-43. Zhu further states that the "organic solvent is preferably used in small amounts" to accomplish the low VOC purposes; teaching a concentration below 20%, preferably 0.1% to about 10%, and more preferably about 1% to about 5%. See col. 8, lines 66-67; col. 9,

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lines 1-6. As noted by the Examiner, Zhu discloses the use of a styrene-maleic anhydride resin. See col. 5, lines 57-67.

Suzuki

Suzuki discloses an ink-jet ink suitable for high speed printing comprising water, a water soluble coloring material, a resinous dispersant, glycerin, ethylene urea, and polyoxyethylene alkyl ether. See col. 3, lines 6-17. It is worthy to note, that the glycerin and ethylene urea "are critically important components" to maintain an ink capable of such printing. See col. 5, lines 64-67. While the ink is directed to certain printing frequencies, Suzuki specifically states that the ink can achieve 5 kHz or 10 kHz but has an "upper limit" of "about 15 kHz in practice." See col. 10, lines 32-44.

Claims 1-6, 8-9, and 11-12

Each of the independent claims recite that the ink is capable of printing at a frequency along the entire spectrum ranging from 3 kHz to 25 kHz. In rejecting independent claims 1 and 11, the Examiner has used two distinct combinations: Parazak, Zhu and Suzuki; and Parazak, Zhu, and Oikawa. As such, these combinations are discussed below.

The Examiner alleges that the combination of Parazak and Zhu teach all the elements of claims 1 and 11 except for a printhead configured for a specific firing frequency and drop volume. However, the present combination of Parazak and Zhu is improper. Specifically, one skilled in the art would be discouraged from combining Parazak with Zhu since Zhu teaches away from the use of organic solvents as found in Parazak. Even though the Examiner has previously acknowledged that since Zhu "limits the use of solvent to 20%," the Examiner contends that unless such use renders the primary reference inoperable, Zhu cannot be said to teach away from Parazak. See Office Action dated July 25, 2007; page 15-16; citing MPEP 2145 II.

This is not how the proper way of applying case law related to "teaching away." This being said, the Applicant submits that such a combination could render the primary reference inoperable based on the teachings of the references as a whole, as Zhu teaches away from the ink composition of Parazak. As the Applicant has raised the issue of teaching away, the Applicant

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would like to review the current case law regarding teaching away for the Examiner's convenience. The Court of Appeals for the Federal Circuit has clearly stated that "an applicant may rebut a *prima facie* case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect." *In re Petersen*, 315 F.3d 1325, 1331 (Fed. Cir. 2003). The Court has also stated that "[w]e have noted elsewhere, as a 'useful general rule,' that references that teach away ~~cannot~~ serve to create a *prima facie* case of obviousness." (emphasis added) *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001). In identifying the appropriate standard for teaching away, the Court has further stated:

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be **discouraged from following the path set out in the reference**, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a **reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.**" (emphasis added) *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994).

Clearly in the present case, a person of ordinary skill in the art would be discouraged from following the path set forth in Parazak which teach the use of up to 50 wt% of organic solvents including low-boiling solvents such as "primary aliphatic alcohols of 30 carbons or less," see col. 4, lines 1-2, based on the teachings of Zhu, since Zhu explicitly states that solvents should be used in small amounts, preferably 1- 5 wt%, see col. 9, lines 4-6, and preferably have "high boiling points," see col. 8, lines 47-48. Furthermore, the Applicant submits that a person skilled in the art, after reviewing each reference in its entirety (as pointed out by the Examiner "the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art" see Office Action dated July 25, 2007; page 15, quoting *In re Keller*) would be discouraged from combining the elements of the respective compositions since the references set out clearly divergent paths in achieving their ink compositions, as evidenced by the difference in the amounts of organic solvents and types of organic solvents used. As such, the Applicant submits that Zhu teaches away from Parazak, and therefore, such a combination cannot be used to establish a *prima facie* case of obviousness.

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The Examiner has cited the Suzuki reference to provide the requisite teaching of high-frequency printing. However, as noted above, Suzuki specifically teaches that the high speed printing frequency has an upper limit of about 15 kHz. As such, the combination would have no likelihood of success in producing the system, method, or ink of the present invention. The Examiner has responded that Suzuki states that the drive frequency is "not limited" and that the frequency has been increased to 10 kHz or higher. The Examiner has also asserted that, in light of this statement, it would be obvious to one of ordinary skill in the art to utilize a printer with firing frequency up to 25 kHz. Applicants would point out, however, that obviousness rejections must be based on findings of how a person of ordinary skill would have understood prior art teachings. Applicants submit that the teaching of Suzuki, taken as a whole, states an upper limit of about 15 kHz and therefore serves to discourage one skilled in the art from utilizing a printer having a higher speed.

Further, and perhaps most importantly, the Applicant submits that Parazak, Zhu, and Suzuki do not teach or disclose an ink that reliably prints across a large range of frequencies, i.e. 3 kHz to 25 kHz, as discussed in the 102 section of the present response. Specifically, the Applicant submits that an ink, falling within the generally component parameters as set forth in the present independent claims but that could not be reliably jetted at all firing frequencies ranging from 3 kHz to 25 kHz, would not be covered by the claim. As such, the frequency response characteristic is a limitation on the scope of the claim that alerts one skilled in the art as to which of the many possible formulations are encompassed by the claim.

However, instead of treating the firing frequency as a claim element, the Examiner has repeatedly alleged that such a frequency is inherent to the composition. If such a viewpoint was adopted, the firing frequency as recited in the independent claims would have absolutely no meaning. Notably, the Examiner has not argued that every ink within the disclosed parameters would be ink-jettable over the disclosed firing frequencies; rather the Examiner contends that absent evidence to the contrary the ink would inherently be ink-jettable over the disclosed range. However, such an inherency argument cannot support a proper 103 rejection.

For the Examiner's convenience, the Applicant wishes to provide the current case law regarding the use of inherency in establishing a proper 103 rejection. In In re Rijckaert, the Court concluded that even though the Board had found that a certain condition was known to be

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optimal, the Court concluded that the condition was not necessarily inherent and overturned the 103 rejections based on such inherency. 9 F.3d 1531, 1533-34 (Fed. Cir. 1993). Specifically, the Court provided several inherency standards applicable to obviousness, including:

"[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient [to establish inherency]." In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981) (citations omitted). "That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown." In re Spormann, 53 C.C.P.A. 1375, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966). Such a retrospective view of inherency is not a substitute for some teaching or suggestion supporting an obviousness rejection. See In re Newell, 891 F.2d 899, 901, 13 USPQ2d 1248, 1250 (Fed. Cir. 1989).

As applied to the present case, the mere fact that the combination of Parazak and Zhu contains materials that may provide an ink that is ink-jettable over a firing frequency of 3 kHz to 2.5 kHz, such disclosure is not enough to establish inherency. Additionally, even if the present combination may be inherent from Parazak and Zhu's description, the present combination of materials that are "reliably jettable at all firing frequencies ranging from 3 kHz to 25 kHz" was not known, nor has the Examiner make such an allegation. As such, the Applicant submits that the Examiner has not established the recited firing frequencies through inherency. Therefore, the Applicant submits that the present pending claims contain an element that has not been disclosed or taught in the cited art, and therefore, respectfully requests that the Examiner withdraw the present rejection.

In another set of rejections of independent claims 1 and 11, the Examiner has cited Oikawa to provide a teaching of a high-frequency print head. While Oikawa does refer to increasing heater driving frequency to several tens of kHz, the language cited simply refers to a general trend in meeting demand for faster printing without indicating the feasibility of any given frequency range. In fact, the reference goes on to discuss the limitations encountered when increasing frequency, e.g. the growing conflict between control pulse width and firing period eventually lead to ejection failure. Col. 3, lines 7-11. In any event, Oikawa does not remedy the deficiency of Parazak and Zhu with regard to teaching an ink that is reliably jettable at all firing frequencies from 3 kHz to 25 kHz.

As Parazak and Zhu combined with either of Oikawa or Suzuki fail to provide each and every element of independent claims 1 and 11, Applicants submit that a *prima facie* case of obviousness against these claims is not supported. Furthermore, the other references cited

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against the claims depending from these do not remedy the deficiency of Parazak, Zhu, Oikawa, and Suzuki. The Applicants respectfully request that the current rejections be withdrawn.

Claims 21-26 and 28-29

The Examiner has used the combination of Parazak and Zhu to reject claims 21-26 and 28-29, asserting again that the combination provides an ink that is intrinsically reliably jettable at all firing frequencies from 3 kHz to 25 kHz. The Applicants reiterate their positions discussed above with regard to the teaching away arguments and the firing frequency characteristic as an actual limitation of the claims, and incorporate those arguments here by reference. Each limitation must be disclosed in the prior art references to support a case for obviousness. Neither Parazak nor Zhu teach the frequency characteristic required by the present claims. Furthermore, such a teaching is not inherent or intrinsic to either of these disclosures. As such combining them does not yield the present invention, nor is the combination itself obvious to do so. As the combination of Parazak and Zhu does not provide each and every element of the pending claim set, the Applicants respectfully request that the current rejections be withdrawn.

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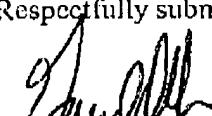
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In light of the above, Applicant respectfully submits that pending claims are allowable over the cited prior art. Therefore, Applicant requests that the rejections and objections be withdrawn, and that the claims be allowed and passed to issue. If any impediment to the allowance of these claims remains after entry of this Amendment, the Examiner is encouraged to call Gary Oakeson at (801) 566-6633 so that such matters may be resolved as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 08-2025.

DATED this 15th day of March, 2008.

Respectfully submitted,



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